

# EUROPEAN PATENT OFFICE

## Patent Abstracts of Japan

PUBLICATION NUMBER : 11317530  
PUBLICATION DATE : 16-11-99

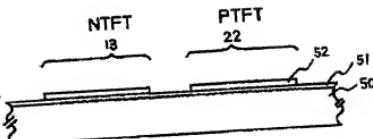
APPLICATION DATE : 22-02-99  
APPLICATION NUMBER : 11043976

APPLICANT : SEMICONDUCTOR ENERGY LAB CO LTD;

INVENTOR : YAMAZAKI SHUNPEI;

INT.CL. : H01L 29/786 H01L 21/336 G02F 1/136

TITLE : SEMICONDUCTOR DEVICE



**ABSTRACT :** PROBLEM TO BE SOLVED: To enable a semiconductor device of high performance to be manufactured at a low temperature, by a method wherein an intrinsic non-single crystal semiconductor layer is formed on a silicon oxide film through a vacuum CVD method where disilane or trisilane is used, the intrinsic non-single crystal semiconductor layer is heated at a specific temperature to turn crystalline, and a gate insulating film is formed on the semiconductor layer.

SOLUTION: A silicon oxide film is formed as a blocking layer 51 on a glass 50, and a silicon film is formed thereon using disilane or trisilane through a vacuum CVD method. In this case, this process is carried out, for instance, at a temperature of 530°C lower than a crystallization point. Then, an amorphous silicon film is formed and thermally treated at an intermediate temperature lower than 700°C, for instance, at a temperature of 450 to 700°C in a non-oxidizing atmosphere. Through this annealing process, the silicon film is transformed from an amorphous structure to another structure of high order and partially turned into a crystalline state. A silicon oxide film is formed thereon as a gate insulating film.

COPYRIGHT: (C)1999,JPO